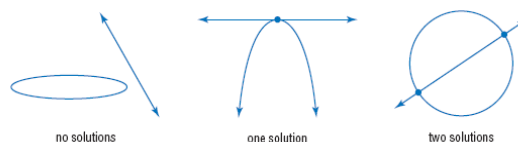


8-7 Solving Quadratic Systems

Line and quadratic

Quadratic and quadratic

SYSTEMS OF QUADRATIC EQUATIONS If the graphs of a system of equations are a conic section and a line, the system may have zero, one, or two solutions. Some of the possible situations are shown below.



If the graphs of a system of equations are two conic sections, the system may have zero, one, two, three, or four solutions. Some of the possible situations are shown below.



Solve.

$$4x^2 + y^2 = 25$$

$$2x + y = -1$$

$$y = -2x - 1$$

$$(a+b)^2 = a^2 + 2ab + b^2$$

ellipse
line

$$4x^2 + (-2x - 1)^2 = 25$$

$$4x^2 + 4x^2 + 4x + 1 = 25$$

$$8x^2 + 4x - 24 = 0$$

$$2x^2 + x - 6 = 0$$

$$2x^2 + 4x - 3x - 6 = 0$$

$$2x(x+2) - 3(x+2) = 0$$

$$(2x-3)(x+2) = 0$$

$$x = \frac{3}{2} \quad x = -2$$

* Always plug back into the line *

$$\left(\frac{3}{2}, -4\right) \quad (-2, 3)$$

Solve.

$$x^2 - 3y^2 = 8$$

$$x - y = 2$$

hyperbola
line

$$x = 2 + y$$

$$(2+y)^2 - 3y^2 = 8$$

$$4 + 4y + y^2 - 3y^2 = 8$$

$$-2y^2 + 4y - 4 = 0$$

$$y^2 - 2y + 2 = 0$$

$$\frac{2 \pm \sqrt{4 - 4(2)}}{2}$$

No Real
sol'n

Solve.

$$x^2 + 2y^2 = 23$$

$$2(2x^2 - y^2 = 1)$$

ellipse

hyp

$$\frac{x^2 + 2y^2 = 23}{4x^2 - 2y^2 = 2}$$

$$5x^2 = 25$$

$$x^2 = 5$$

$$x = \pm\sqrt{5}$$

$$\{(\pm\sqrt{5}, \pm 3)\}$$

$$(\sqrt{5}, 3)$$

$$(\sqrt{5}, -3)$$

$$(-\sqrt{5}, 3)$$

$$(-\sqrt{5}, -3)$$

Solve.

$$x^2 + y^2 = 25$$

$$2x^2 - 3y^2 = 30$$

Solving systems of Inequalities.

$$x^2 + y^2 \leq 9$$

$$y > x^2 + 1$$

parabola

Circle

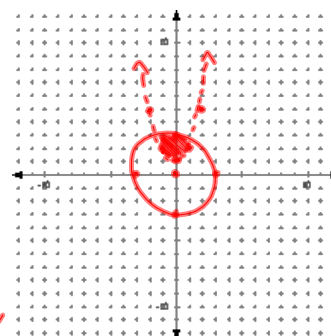
$$C(0,0)$$

$$r=3$$

shade
inside

$$V(0,1)$$

$$(1,2) (-1,2)$$

shade
outside

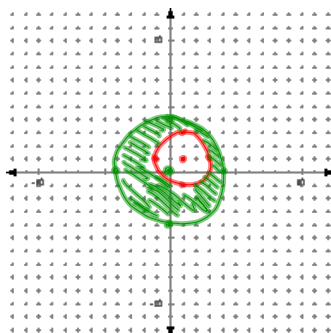
Solve.

$$x^2 + y^2 \leq 16$$

$$(x - 1)^2 + (y - 1)^2 \geq 4$$

$C(0,0)$ solid
 $r=4$ inside

$C(1,1)$ solid
 $r=2$ outside



HW

p458-459

17, 19, 21, 24, 28, 32-34

line up

do on desmos.com